DOCUMENT RESUME

ED 060 065 TM 001 153

AUTHOR Hapkiewicz, Walter G.
TITLE Mastery Learning Options in Teaching Educational Psychology.
PUB DATE Apr 72
NOTE 12p.; Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, Illinois, April 1972

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS College Instruction; *Course Evaluation; *Criterion Referenced Tests; *Educational Psychology; Graduate Study; Individualized Instruction; Learning Motivation; *Program Evaluation; Student Attitudes; Student Motivation; Study Habits; *Teaching Methods; Teaching Techniques

ABSTRACT

This paper examines a program instructing pre-service and practicing teachers in educational psychology. It is concluded that the program, which utilizes a mastery approach, produces significantly better results than does the traditional method. (DLG)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

ED 060065

Mastery Learning Options in Teaching Educational Psychology

Walter G. Hapkiewicz

Michigan State University

Increased student enrollment, declining financial resources, and both faculty and student dissatisfaction with traditional large lecture approaches has stimulated a search for innovative and efficient methods of teaching in higher education. This search is growing rapidly and in many cases, independently, in several different quarters. Bloom (1) advocated "mastery learning" strategies while Keller (8) and Ferster (4) urged the use of "contingency management" and "interview" techniques derived from operant conditioning. More recently Goldschmid (5) has proposed use of the "learning cell" and Maier (10) argued for teaching strategies which would improve problem solving skills. The operating procedures necessary to implement each of these methods are highly similar and, in general, have proven to be more successful than traditional lecture-examination approaches. Basically, these procedures have been concerned with increasing student participation by organizing students in pairs (e.g. Goldschmid's learning cell), providing assignments, and encouraging students to interact, checking one another's competency as they progress through a course at their own rate. To date, most of these experimental teaching procedures have been applied to large undergraduate classes while few attempts have been made to use them in the teaching of pre-service or in-service teachers. Additional efforts along these lines would appear to have several advantages: 1) they should, judging from previous research, prove to be more effective in teaching substantive content than other, more traditional approaches, 2) they may serve as a model which teachers

TM 001 153

themselves might emulate in their own classes, and 3) if such methods generate a substantial amount of positive affect they may be more effective in convincing teachers to use principles taught in the course as well as the method for teaching them. Therefore, the following investigation was conducted to evaluate a mastery learning strategy in teaching educational psychology to classes consisting primarily of pre-service and practicing teachers. However, unlike previous studies students were not required to achieve mastery on each unit before they were eligible to proceed. Rather, standards for each grade level were specified at the beginning of the course and students were given the option to repeat mastery tests without penalty.

Method

Subjects. Students enrolled in a basic educational psychology course during two consecutive terms served as subjects. Two sections were offered each term. The total number of students enrolled in the mastery sections was 90 while 77 participated in the traditional classes. No information prior to the first class meeting was provided with regard to the particular instructional strategy to be used. The average age of those enrolled was 27.5 years and ranged from 26.5 to 28 for each section. Approximately 55% of the students enrolled in the traditional sections were females and this figure increased to 65% of the enrollment in mastery learning sections. About 35% of the students in each group were undergraduate education majors, 55% were working toward the Master's degree, and 10% were doctoral students. Most of the students in the latter two categories were practicing teachers.

Staff. The course instructor, a graduate assistant, and five proctors conducted the course. All proctors were graduate students recruited from previous terms and participated only in the experimental course. Criteria for selection included high achievement and enthusiasm for the course. All proctors were compensated with three hours of practicum study credit. The student-staff ratio was approximately 10 to 1 at any given time.

Defining Mastery Standards. Various levels of mastery were defined by referring to normative standards previously used in teaching the course. For example, approximately 10% of the students in a previous term scored 90% or above on the course examinations. Therefore, the 90% standard was subsequently used as the criterion for achieving an "A" under the mastery approach.

Procedure. One section per quarter was taught using the mastery strategy while the other was taught in the more traditional mode. Since one section was taught in the morning and one in the evening instructional modes were counterbalanced across the two quarters (e.g. the mastery method was used in the morning during one quarter and in the evening during the next quarter). The mastery learning sections were organized as follows: 1) the course material was divided into 10 units (chapters 1-10 of Dececco's The Psychology of Learning and Instruction: Educational Psychology, 2); 2) instructional objectives accompanied each unit of material; 3) two parallel forms of multiple choice quizzes (ranging from 10 to 17 items) and several essay questions were available for each unit; 4) before attempting a quiz the student was required to participate in a conference conducted

by one of the staff (usually a proctor); 5) a final examination and a 5-point attitude scale were administered at the completion of the course; 6) all students were told that the purpose of the final was to evaluate the course and would not affect their grade; and 7) students progressed through the course at their own rate.

The following sequence is typical of the manner in which students progressed through the course. Upon completing his study of each unit the student participated in a conference with a proctor. The purpose of the conference was to give the student practice in discussing the material and diagnose difficulties before the student attempted the quiz. This was particularly important since there were only two forms of each quiz. Proctors asked questions, which were standardized for each unit, at the beginning of each conference and provided tutoring as needed. The conferences were approximately 5 to 15 minutes in length. Proctors could make recommendations for further study but the student ultimately decided when he was ready for the quiz. The various forms of quizzes were administered randomly to obtain exposure to all test items and reduce the probability of student cheating by memorizing a limited number of items. Proctors graded quizzes immediately after the student completed them and provided remedial discussion of points misunderstood. At this point the student was eligible to move on or retake the alternate form of the quiz without penalty. Once satisfied with his performance on the multiple choice items he was required to answer one essay question (usually worth 3 points) covering that unit. A separate record was kept for each student which indicated: (1) the proctor he had conferred with; (2) the form of the quiz he was taking or had completed;

and (3) his score on each quiz. All records were kept by the graduate assistant. Since these procedures were generally conducted during class time the instructor was always available to discuss problems on an individual basis with students. In addition, four lectures and three films were provided, attendance at which was optional.

The section that was taught in a conventional manner received the same lectures and films and sat for three examinations. The same items were used for both groups by simply combining the quizzes used in the mastery section. Once again, both forms of the quizzes used and were randomly distributed to the students. The class following the examination was used to provide feedback and discussion of test items.

Results

The number of students dropping and adding the course was 21 and 14 for the traditional classes and 23 and 16 respectively, for the mastery learning classes. The number of students failing to complete the course was 6 and 9 respectively.

In comparing the test results of the two groups only the scores achieved by the mastery group on the first attempt were used. A t test performed on the total unit test scores for each group was significant ($T = 49.9$, $df = 151$, $p<.0001$). Inspection of these unit scores for each group, portrayed in Table 1, reveals large and consistent differences

---

Insert Table 1 about here

---

between the groups on each unit. An additional analysis, using the class

as the statistical unit, also revealed a significant difference between the two groups (T = 43.8, df = 2, p<.025).

Students taking the three extensive examinations averaged about 77% overall while students enrolled in the mastery group, who took the same tests divided into 10 units averaged 90%. The latter group also performed better on an 83 item multiple choice final but the difference was not significant.

For the mastery learning group 97 initial attempts on mastery tests failed to meet the 80% criterion. However, 77 additional attempts were made by those students involved to restudy and take the alternative form of the test. In addition, the 80% standard was initially achieved 104 times but only 37 attempts were made to improve. These additional efforts resulted in 66 students achieving over 90% on the unit tests, 15 over 80%, and none below the "B" standard. Comparable data for the control class was as follows: 90% - 4; 80% - 34; 70% - 19; 60% - 9; and 50% - 5.

Since both forms of the tests were randomly distributed to both groups it was possible to compare the average difficulty and discrimination index of each test to its alternate within each group. This comparison revealed, that in fact, the parallel forms were practically identical in difficulty and discriminating power.

Analysis of the composite student evaluations indicated that those taught by the mastery method rated the course more positively than students who were taught in the conventional manner (T = 28.2, df = 151, p<.0001). Post-hoc analyses of individual rating scales revealed that students in the mastery sections were more likely to view the course as superior compared

to others they had taken in college ($p<.0001$), recommend the course to other students ($p<.0001$), pursue additional work in educational psychology ($p<.05$), and most importantly, reported that the course would have more effect on their own teaching ($p<.01$). In addition, when compared to the ratings of the traditional group students in the mastery sections reported a significant decrease in test anxiety as they progressed through the course ($p<.0002$). A decrease was reported by 70%; 26% said that their anxiety remained constant throughout the course; and 4% reported that their anxiety level increased. Comparable data for the conventional group was 25%; 50%; and 25% respectively. When asked if they would be willing to help another student learn the course material students in the mastery course were significantly more cooperative ($p<.02$). That is, when asked the preceding question they generally responded with an unqualified "yes" rather than "maybe, depends on amount of time involved." Of those students participating in interviews 50% said that they were more effective as a teaching device than listening to lectures, 38% said they were about equally effective, and 12% said they were less effective. Similarly the mastery learning group was more likely to consider the course well organized (85% vs. 50%).

Finally, students in the mastery group reported spending significantly more time studying than students in the other group ($p<.07$). However, when asked to rate the course requirements on a 5 point scale from "too easy" to "too difficult" the results from both groups were practically identical.

Discussion

The results indicate that the motivational aspects of the mastery model are substantial, that is, all students can achieve A's and B's if

the appropriate instructional conditions are provided. Importantly, this was accomplished without requiring specific levels of mastery and by using a set of standards derived from normative scales. These results appear to be substantially different from those obtained when teaching undergraduate students who elected to perform at lower levels (e.g. achieve C's or D's) when the instructor indicated that such performance was acceptable (Lloyd, 1971).

The achievement of students in the mastery group surpassed the accomplishments of those taught by more traditional methods at each point in the course. This was also true on the final examination although the statistical difference between the two groups did reach traditional levels. This was probably due to the fact that the final did not affect anyone's grade. Many students in the mastery group were tired of testing and later reported answering the questions in a random fashion.

At least one explanation for the superior performance demonstrated by the mastery group is the additional amount of time that they spent in study. This finding is consistent with results obtained in subsequent terms (6) and in other investigations (7). The increase in study time is also related to the high degree of satisfaction that students expressed toward the course and illustrates the importance of both cognitive and affective factors in learning (11). That is, the students were virtually guaranteed successful experiences and they in turn, responded positively, exerting more effort in this course than in most others they had taken in college. The instructional conditions permitted them to work cooperatively rather than to avoid it for fear that such activities would have the effect of lowering their own grade. On the evaluative questionnaire several students

made statements similar to the following, "There was much cooperation in class to help each other learn." Such activities increased the degree to which students practiced interviewing, tutoring, and facilitated their learning.

One of the most important outcomes of the current investigation was the number of students in the mastery group who reported that their test anxiety decreased as the course progressed. Such anxiety is known to be widespread among students of all ages and negatively correlated with school performance (3). This provides yet another explanation for the superior academic performance of this group and illustrates that mastery learning strategies have affective results which are of considerable importance. One student offered the following comment "The best part of this course was mastery testing in place of 'anxiety' tests."

Although many students were initially "suspicious" and uncertain concerning the manner in which the course was taught the unavoidable and at times intensive, interaction between staff and students appeared to produce considerable attitudinal changes. The role of the instructor completely changed from lecturer to manager, tutor, and resolver of grievances. His role not only changed, but it was often quite different from the roles of the graduate assistant and proctors. That is, he was freed to meet individual needs of students such as discussing practical applications of theory to educational problems that they encountered or, to engage in more extensive discussion of the theories themselves. The graduate assistant was primarily concerned with keeping course records while the proctors were more extensively involved in interviews, administering and scoring mastery

tests, and providing feedback to students. Although there was certainly some overlap in the duties performed by the staff there was also definite division of labor amongst them. Thus, no one staff member was forced to meet all of the varied needs of the students. Finally, students enrolled in the mastery-learning sections viewed the course as having more effect on their own teaching than those taught by more conventional procedures. One student succinctly summarized the point saying "I hope I will be able to incorporate this method in my classroom."

Although the current study yielded several interesting findings it also raises several additional questions. For example, do students necessarily have to be interviewed by trained proctors or can they interview one another without sacrificing substantial achievement gains? From data gathered concureently and subsequent to this study the answer appears to be "yes" (6). What is the effect of mastery learning strategies on the teaching methods of pre-service and in-service teachers? Does the reduction in test anxiety generalize to other courses? Do high grades or the expectation of high grades significantly influence student ratings of course effectiveness? Research on these, as well as other questions derived from our studies is currently being conducted.

References

1. Bloom, B.S. Learning for Mastery. UCLA-CSEIP Evaluation Comment, 1, No. 2, 1968.

2. DeCecco, J. P. The psychology of learning and instruction: Educational psychology. Englewood Cliffs, New Jersey: Prentice-Hall, 1968.

3. Elder, G.H. Adolescent socialization and development. In E.F. Borgatta & W.W. Lambert (Eds.) Handbook of personality theory and research. Chicago: Rand McNally, 1968. Pp. 239-364.

4. Ferster, C.B. Individualized instruction in a large introductory psychology college course. Psychological Record, 18: 521-32; Fall 1968.

5. Goldschmid, M.L. The learning cell. Learning and Development (McGill University, 2: 1-6; January 1971.

6. Hapkiewicz, W.G. An investigation of mastery learning strategies for teaching introductory educational psychology. Final Report: Educational Development Program, Michigan State University: December 1971.

7. Johnston, J.M. & Pennypacker, H.S. A behavioral approach to college teaching. American Psychologist, 26: 219-44; March 1971.

8. Keller, F.S. "Good-bye, Teacher..." Journal of Applied Behavior Analysis, 1: 79-90; Spring 1968.

9. Lloyd, E.E. Contingency management in university courses. Educational Technology, 11:18-23; April 1971.

10. Maier, N.R.F. Innovation in education. American Psychologist, 26: 722-25; April 1971.

11. Roden, A.H. & Hapkiewicz, W.G. Respondent learning and classroom practice. In R.D. Klein, W.G. Hapkiewicz & A.H. Roden (Eds.) Behavior modification in education settings. Springfield, Illinois: Charles C. Thomas, 1972. In press.

Table 1

Percentage of Test Items Answered Correctly by each Group

Unit	Mastery	Traditional
1	92	84
2	92	82
3	84	72
4	89	72
5	87	69
6	91	76
7	90	75
8	88	78
9	95	87
10	88	74
Final	57	55